



Timeline for Portland Metals Investigation February 25, 2016

The following is a timeline of activities by the Oregon Department of Environmental Quality (DEQ) and other agencies before and after discovery of cadmium and arsenic concentrations above benchmark levels in Portland's air.

2003 to present: DEQ conducted baseline and ongoing air toxics monitoring in Portland.

- Since 2003, DEQ has operated an air quality monitor continuously at North Roselawn near Jefferson High School.
- In 2005, with EPA funding, DEQ measured concentrations of air toxics, including metals, at six locations in the Portland area, finding levels of many pollutants above clean air benchmarks.
 - Benchmarks are Oregon's protective "clean air" goals that were developed by DEQ to address toxic air pollutants. There are no direct regulatory requirements associated with benchmarks. Air quality standards are set at the federal level by the US Environmental Protection Agency (EPA) nationwide for a different category of pollutants called criteria pollutants, which include: Particulate Matter, Ozone, Carbon Monoxide, Lead, and other pollutants.

August 2009 to October 2011: [DEQ convened Portland Air Toxics Solutions Project.](#)

- In 2009, DEQ convened the Portland Air Toxics Solutions Project (PATs) and worked with local communities to develop air toxics reduction strategies for the Portland region, including portions of Multnomah, Washington and

Clackamas counties. That work resulted in high-priority recommendations, including wood smoke reduction, measures to decrease car and truck emissions, developing policy proposals to accelerate use of clean diesel engines in highway and construction equipment, and conducting additional research on the sources of cadmium and arsenic in Portland.

- During the PATS process, DEQ performed computer modeling that predicted air pollution concentrations, based on assumptions about the amount of emissions from potential sources and the ways pollutants might move through the environment. To validate these computer models, DEQ compared the results to information collected from air sampling. The concentration levels of cadmium and arsenic measured in the air did not match the results obtained from the computer modeling; the modeling predicted lower values than the air samples showed. This confirmed the need for additional data collection, described below.
- Since 2012, DEQ has been implementing several of the Portland Air Toxics Solutions Project (PATS) high priority recommendations, such as voluntary diesel retrofits, and working with local governments to implement woodstove curtailment programs.

2009 and 2011: EPA performed air toxics monitoring at Harriet Tubman School in North Portland.

- Beginning in 2009, EPA conducted two separate air toxics monitoring efforts at Harriet Tubman School in North Portland as part of its nationwide school monitoring study. The first study occurred August 23 to November 3, 2009.
- EPA's second monitoring effort took place May 27 to July 17, 2011, for air toxics, including cadmium, at Harriet Tubman School. EPA noted that levels of cadmium measured at Tubman school were "well below levels of significant concern" for both short-term and long-term exposures. However, the findings were 2-3 times above Oregon's more protective benchmarks for cadmium, prompting the need for additional monitoring and ongoing identification of sources.

June 2012 through September 2013: DEQ focused research and analysis on cadmium in Portland.

- DEQ analyzed existing monitoring, meteorology and data from facilities with air pollution permits in an attempt to locate the sources of cadmium in the Portland area.
- DEQ concluded that there were likely multiple sources of cadmium, and recommended additional monitoring to identify specific sources.

February 2013 to present: DEQ and US Forest Service collaborated to test new air pollution detection methods for urban settings.

- DEQ and the US Forest Service (USFS) developed a project to analyze samples of moss taken from Portland trees, and to compare moss data to monitored and modeled air pollution data in Portland. The research and collaboration to compare moss data to air monitoring results is groundbreaking. This sophisticated spatial and statistical analysis has not been performed anywhere else in the country to understand urban sources of air pollution.
- The project initially focused on a class of pollutants called polycyclic aromatic hydrocarbons (PAHs), which result from combustion of carbon-containing fuels. In DEQ's ongoing efforts to identify specific sources of cadmium and arsenic emissions in Portland, DEQ requested that the US Forest Service analyze the moss samples for cadmium, arsenic and other metals.
 - December 2013 to June 2014: The USFS collected, analyzed and received raw results for 346 moss and soil samples in Southeast Portland.
 - November 2014 to August 2015: The USFS collected, analyzed and received raw results for 164 additional moss samples from Portland Public Schools.

May 15, 2015: DEQ received initial moss cadmium concentration data from US Forest Service.

- USFS informed DEQ about raw cadmium moss results and its intention to collect additional samples in Southeast Portland to improve data, and map cadmium and other metals with greater definition. This was a new approach and no standard operating procedures or established methods

applied to conclude what the concentrations in air may have been based on the concentrations in moss.

June 2015: DEQ identified glass facilities as potential sources of cadmium and arsenic.

- DEQ researched industrial facilities in the proximity of pollutant hot spots on USFS moss concentration maps.
- DEQ obtained and sent precise geographic information about art glass facilities to USFS resulting in a geographic overlay of moss hot spots with art glass facilities, which indicated a correlation between cadmium hot spots and Bullseye Glass Co. and the area near Uroboros Glass.

June 25, 2015: US Forest Service presented draft research findings at a technical forum.

- USFS presented raw cadmium and PAH maps at a Northwest Airquest air quality technical meeting for methodology discussion.
- Requests for more information about the moss maps should be directed to the USFS, Yasmeen Sands, Public Affairs Specialist, Forest Service, Pacific Northwest Research Station, p: 503-808-2137, c: 206-450-0319, ysands@fs.fed.us.

August and September 2015: DEQ planned air monitoring in Southeast Portland.

- August 26, 2015: Because the data from moss samples did not indicate actual concentrations of pollutants in the air people were breathing, DEQ needed to sample the air itself. DEQ met with Reed College, Portland State University and USFS researchers to create an air quality monitoring plan for Southeast Portland.
 - DEQ selected the Southeast Portland location because it showed the highest concentrations of cadmium in moss.
 - DEQ conducted sampling in October because results from the Portland North Roselawn air toxics monitor showed a pattern of elevated cadmium concentrations at other locations during the fall months, particularly in October.
- In September 2015, DEQ planned its monitoring by analyzing locations, obtaining permission from the landowner, locating equipment, securing a power source, and assigning staff to perform monitoring.

October 6 to mid-November 2015: DEQ conducted air sampling at SE 22nd Ave. and Powell Blvd.

- DEQ set up and operated sampling equipment at Southeast 22nd Avenue and Powell Boulevard beginning October 6, 2015. The equipment collected 18 twenty-four hour samples between October 6 and November 2.
- After sampling was completed, DEQ weighed and packaged samples at the DEQ laboratory, and sent them to Desert Research Institute (DRI), a laboratory with analytic capabilities to evaluate such samples. DRI analyzed samples within a standard 45-day processing time period.

October 10 to November 9, 2015: US Forest Service conducted additional moss monitoring in Southeast Portland.

- USFS collected, sent for analysis and received results for 25 additional moss and soil samples in Southeast Portland. The additional samples added detail and accuracy to the research database.
- November 15, 2015: DEQ receives additional moss monitoring data. USFS sent DEQ preliminary maps of new moss data.

January 2016: DEQ received and evaluated initial data, and worked with partners to interpret air monitoring data from SE 22nd Ave. and Powell Blvd.

- January 15, 2016: The DEQ lab received initial analytical data from DRI and began reviewing them for validity and quality.
January 19, 2016: DEQ Lab staff sent results to Air Quality Planning staff.
- January 20, 2016: DEQ Air Quality Planning staff received results from the lab, and notified DEQ Northwest Region Administrator and Air Quality managers that one month of air monitoring data was available from samples taken at Southeast 22nd Avenue and Powell Boulevard.
- January 20, 2016: DEQ determined that cadmium and arsenic concentrations were about 50 and 150 times above DEQ's ambient benchmark concentrations, respectively. This information was cause for immediate concern.
- January 21, 2016: DEQ Air Quality Planning staff informed the Oregon Health Authority (OHA) about monitoring results.
- January 22, 2016: DEQ, OHA, USFS and Multnomah County Health participated in a conference call to discuss data and determine next steps, including the need for maps to help identify potential areas of concern.

January 26, 2016, to present: DEQ planned and began external communication about air monitoring data.

- January 26, 2016: AQ Planning staff and NW Region AQ staff discussed results and continued planning for information dissemination.
- January 28, 2016: OHA briefed DEQ about its initial interpretations of the limited data (i.e. one month of air monitoring data with no calculated area of impact), and the two agencies began planning public outreach and communication for the week of February 1, 2016.
- January 30, 2016: DEQ staff visited Powell Park and neighborhoods near Bullseye Glass Co. to better understand the neighborhood, residences, other businesses, and proximity of the childcare facility.
- February 1, 2016: DEQ receives final quality control validated results from the contract lab. OHA, DEQ and Multnomah County Health worked to finalize data and health related information and a news release.
- February 2, 2016: OHA informed the Creative Children's Learning Center and its headquarters office about the monitoring results and planned communications. DEQ notified the Fred Meyer corporate office.
- February 3, 2016: DEQ and OHA issued a joint news release, continued coordination on additional data needs and began planning for additional monitoring.

February 1, 2016, to present: DEQ conducted additional site visits to glass manufacturers, requested additional information.

- February 1, 2016: DEQ performed an unannounced inspection at Bullseye Glass Co. to verify compliance, observe operations and discuss sampling results.
- February 5, 2016: DEQ provided one hour notice to Bullseye Glass Co. before performing an announced inspection.
- February 6, 2016: DEQ conducted an unannounced onsite visit at Uroboros Glass in North Portland to observe operations.

February 11-12, 2016: Facilities ceased using cadmium, arsenic, and some chromium.

- February 4, 2016: Bullseye Glass Co. voluntarily suspended its use of cadmium and arsenic.

- February 8, 2016: Uroboros Glass voluntarily suspended the use of cadmium and stated that it has not used arsenic for 20 years.
- February 8-10, 2016: DEQ began researching additional metals used in the glass manufacturing process, developing soil sampling plans, and considering public input. DEQ consulted with national experts who expressed concern about the potential for trivalent chromium to oxidize into hexavalent chromium. DEQ determined that hexavalent chromium was a potential contaminant of concern and requested Material Safety Data Sheets (MSDS) from Bullseye Glass Co. and Uroboros Glass.
- February 11, 2016: DEQ reviewed MSDS sheets provided by Bullseye Glass Co. and Uroboros Glass, and concluded there was enough uncertainty about the companies' use of hexavalent and trivalent chromium compounds to warrant a request to each company to voluntarily cease the use of all chromium compounds.
- February 12, 2016: Bullseye Glass Co. agreed to suspend use of hexavalent chromium, and further agreed to stop using cadmium and arsenic; Uroboros Glass agreed to suspend their use of all chromium compounds and cadmium, and does not use arsenic.

February 9 to present: DEQ participated in interagency public outreach and education efforts.

- February 9, 2016: Multnomah County Public Health and Portland Public Schools hosted a community open house meeting at Cleveland High School with DEQ, OHA and the US Forest Service invited to provide information and answer participants' questions. DEQ worked with partner agencies to identify a date for a similar meeting in North Portland.
- February 12, 2016: DEQ and OHA issued a joint news release inviting media to news conference to provide updated information about the facilities' use of chromium compounds

February 8 to present: DEQ planned additional air and soil sampling in Southeast and North Portland.

- Week of February 8, 2016: DEQ prepared air and soil sampling plans for Southeast Portland to collect data on cadmium, arsenic, chromium and other metals and began preparing similar sampling plans for North Portland.

- February 12, 2016: DEQ deployed air sampling equipment and began taking soil samples in Southeast Portland.
 - Air sampling will be conducted for two weeks. It will take an additional two weeks to complete analysis of the samples.
 - DEQ will continue additional sampling, making potential changes to the sampling plan as informed by data collected during the initial two week sampling event. Soil sampling will be completed by February 19, 2016.
 - DEQ will have the data analyzed with comparisons to risk levels within three weeks. The results will inform what additional sampling or specific actions which may be needed at that time.
- Week of February 15, 2016: DEQ will develop additional air and soil sampling plans for North Portland, and plans to deploy monitoring equipment by Friday, February 19, 2016. At this time, DEQ is not able to project an exact time frame for analysis of air and soil samples for the North Portland location.
- February 19: Air and soil monitoring in North Portland begins, with initial results expected to be available to the public in early April.
- Ongoing: Results of all air and soil sampling will continue to inform DEQ's actions and decision process for subsequent sampling and analysis; DEQ and Oregon Health Authority will screen data as it comes in, and if there are any acute health concerns agencies will immediately notify potentially affected parties.
- Week of March 7: First results from additional air and soil sampling in Southeast Portland expected to be available to the public.

February 11 to present: OHA coordinated interagency Unified Command structure and public health assessment.

- February 11, 2016: Dr. Katrina Hedberg, State Epidemiologist, hosted a planning conversation with OHA staff on viability of labs reporting cadmium-positive urine results to OHA.
- February 12, 2016: OHA initiated a Unified Command and Incident Command Structure (ICS) with the Multnomah County Health Department (MCHD) and DEQ, including a joint information center (JIC). The Incident Management Team (IMT) met and held a meeting/conference call to lay

out structure and roll in a 2-hour meeting. Scheduled staffing of public phone and email seven days a week. OHA established a hotline to answer questions from people and health care providers. A temporary phone number and email address were established to respond to concerns from the community. Press release at Portland State Office Building (PSOB)

- February 12-19, 2016: Ongoing OHA website & resource information updates.
- February 14, 2016: Incident Management Team meeting and conference call convened.
- February 15, 2016: Incident Management Team meeting and conference call convened. Oregon State Cancer Registry (OSCaR) produced original draft of neighborhood cancer rate report for neighborhood around Bullseye Glass Co. in Southeast Portland.
- February 16, 2016: Planning Section formed to work on documentation and resource unit; media monitoring plan established. Finance Chief began planning cost tracking for all PHD staff involved in metals response. An IMT meeting/conference call was held. Dr. Bruce Gutelius reviewed and began editing the initial OSCaR neighborhood cancer rate report. Updated arsenic level map provided to OSCaR by Multnomah County Health Department (MCHD).
- February 17, 2016: Epidemiology and surveillance planning meeting with OHA, MCHD, DEQ, OHSU and other partners. An IMT meeting/conference call was held. Dr. Bruce Gutelius provided OSCaR with edits for the neighborhood cancer rate report and asked for clarification on multiple aspects of the analysis, including the source agency and quality of available maps for arsenic and cadmium for guiding neighborhood cancer analyses for the neighborhood around Bullseye Glass Co.
- February 18, 2016: OHA enacted emergency rule to mandate reporting cadmium-positive urine results. Dr. Paul Cieslak from OHA worked with MCHD, OHSU and the Oregon Poison Center to review evidence and develop guidance for urine specimen testing and with the state public health lab, OHSU and reference labs on issues of testing. An IMT meeting/conference call was held. A JIC meeting was held. Contract with 211 finalized to establish 211 as new hotline for questions from the public, providing 211 staff with FAQs. Dr. Bruce Gutelius confirmed the source agency, quality, and dates of arsenic and cadmium maps for the

neighborhood around Bullseye Glass Co. with US Forest Service , DEQ, and MCHD; he was advised that available maps accurately defined areas of focus for neighborhood cancer rate analyses. Neighborhood cancer rate report for the neighborhood around Bullseye Glass Co. is finalized and posted to the PHD website. Dr. Bruce Gutelius attends press availability and community meeting at Harriet Tubman school in North Portland.

- February 19, 2016: OHA had discussion of tracking costs and financial needs for ongoing work. OHA's Epidemiology program is developing mechanics of labs reporting cadmium urine test results. JIC meeting held. Requested retroactive reports from labs going back approximately two weeks.